



KALMAR

Kalmar Gloria reachstackers (10 up to 130 tons)
5th generation of productivity
30 years experience = 10,000 units built



Demanding customers - worldwide

Reducing fuel consumption is a matter of maintaining the competitiveness in our port.

Stricter regulations make reducing emissions a top priority for us.

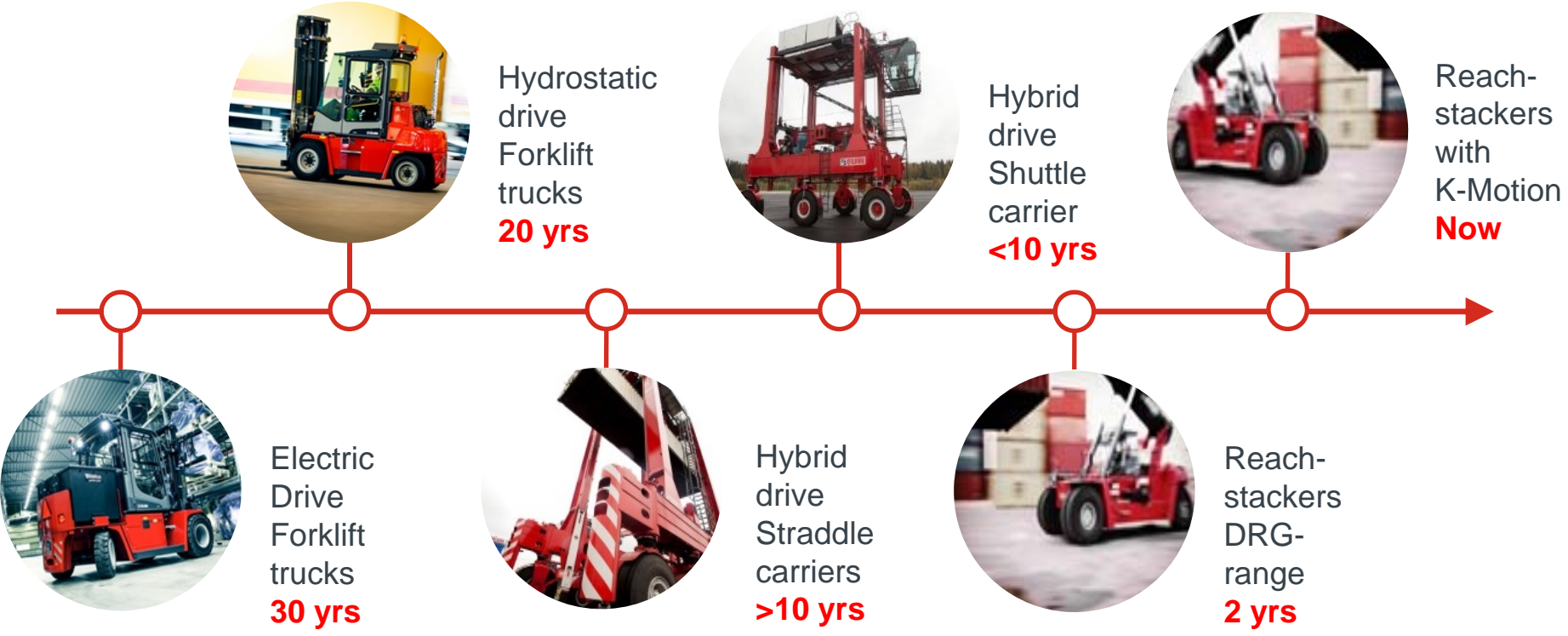
It's vital to increase productivity without increasing costs.

Our port is situated close to residential areas. We're always under the microscope when it comes to noise and emissions.



Kalmar green technologies take a giant leap forward

Developing long-term sustainable technology



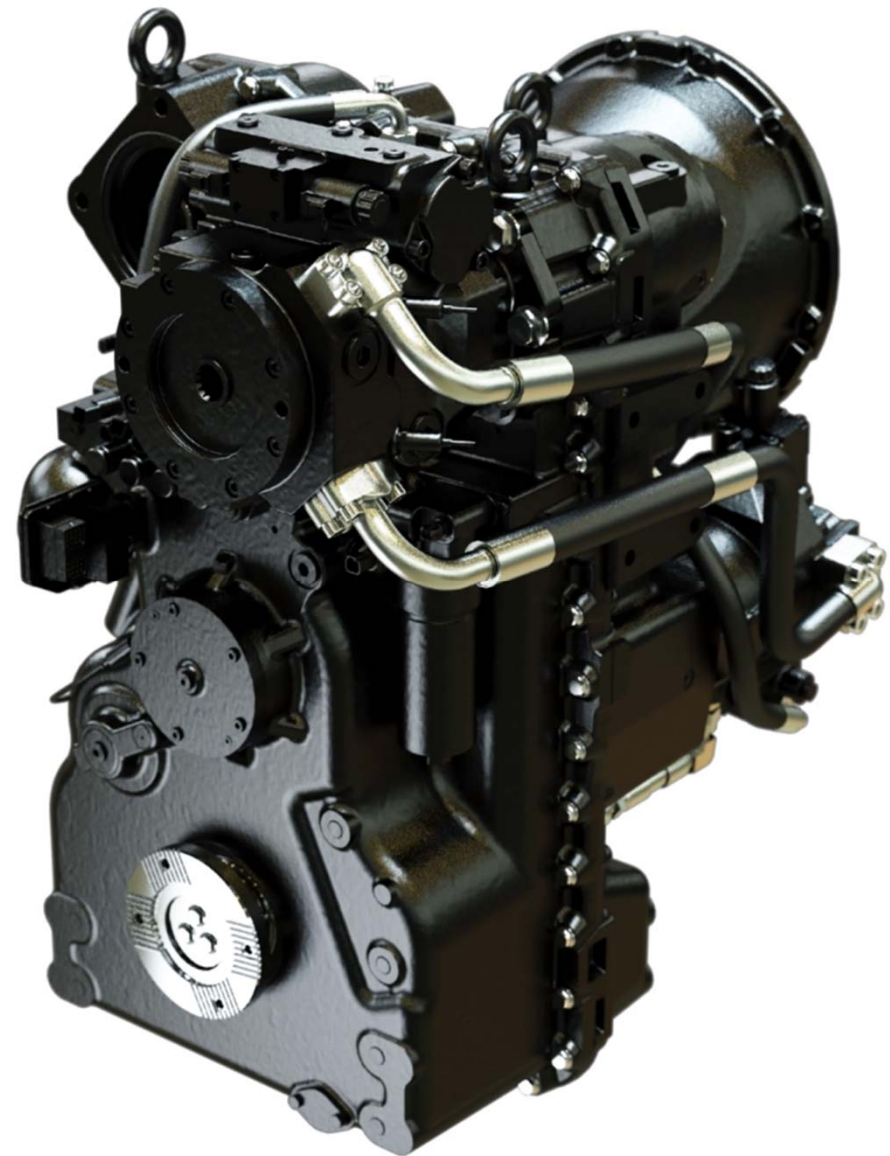
**And now, something
completely different...**

Kalmar K-Motion

All the power. 40% less fuel.

K-Motion delivers

- A **substantial reduction** in fuel consumption without compromising **drive and lift power**
- Field tests prove up to **40% less** fuel used
- **Efficiency in motion**, in both driving and handling



The best of both worlds

Mech. Travel drive with converter

- + High efficiency at high speeds
- + Maximum torque at standstill
- + High degree of maturity



Hydrostatic travel drive

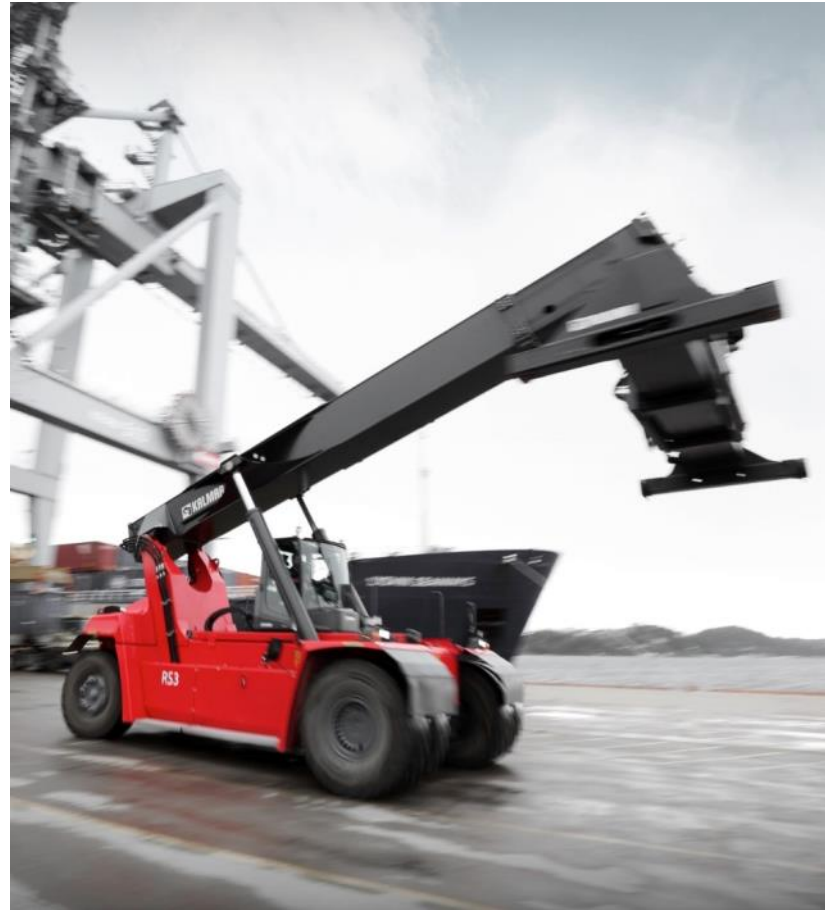
- + Wearless reversing
- + High tractive force at low engine speed
- + Good response, precise manoeuvring
- + High degree of freedom regarding power management



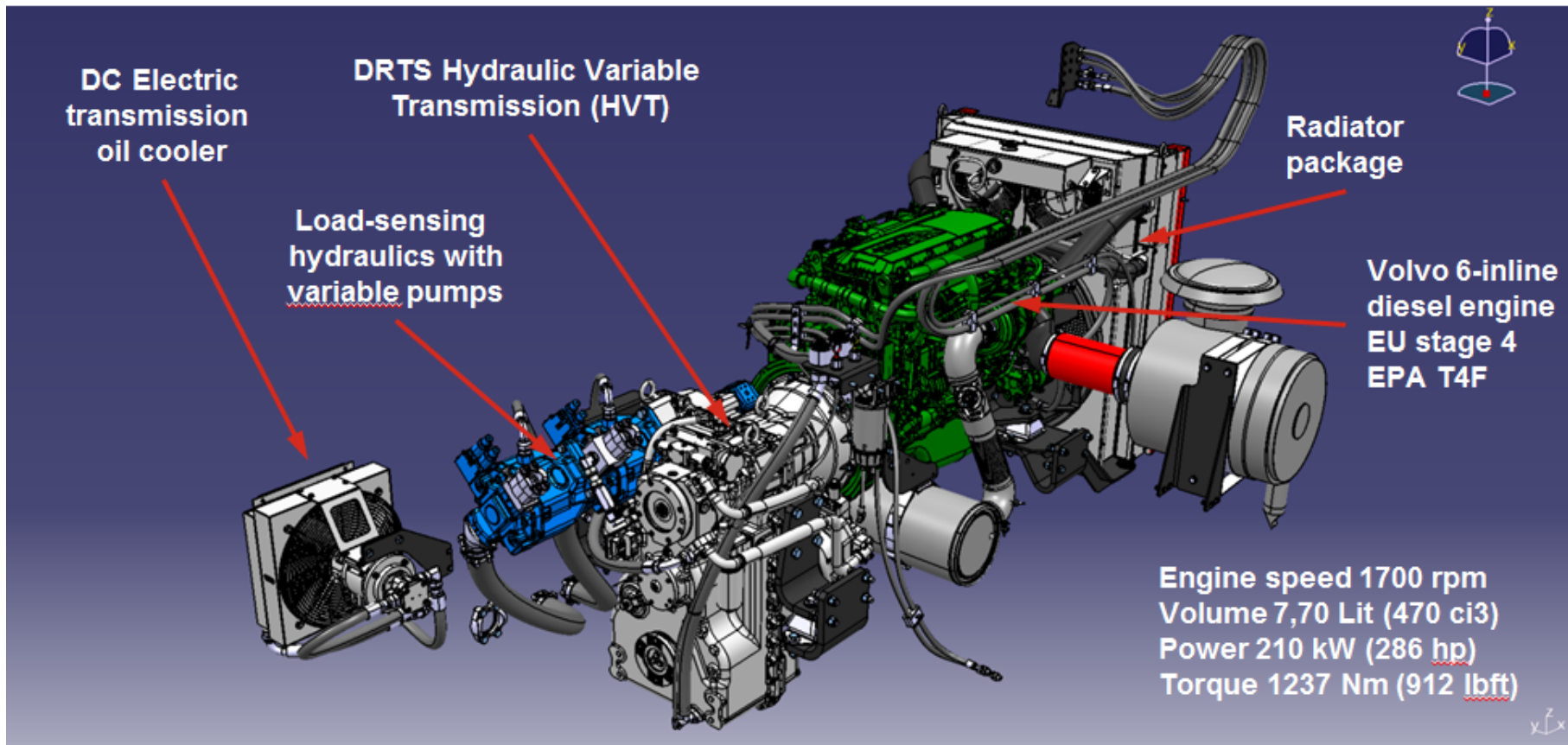
Hydro-Mechanical Variable Transmission

The core advantages

- **Increased savings**, by lower running costs and less emissions
- **Increased efficiency**, by combining quick **hydrostatic** drive (slow-speed) and **mechanical** drive (high-speed)
- **Increased comfort & precision**, by reduced engine speed, **seamless** speed shift + **soft** directional change
- **Increased safety**, by fine-tuned speed pedal and joystick, with hydrostatic drive (power split)



Kalmar K-Motion - more than transmission – a complete drive and lift system



K-Motion new drive + lift functions

- **CVT Power Split**; parallel hydrostatic and mechanical power flow for best **overall drive efficiency** (and lifting efficiency)
- **OptiSpeed**; high speed **lifting** + slow speed **driving** (forward and reverse), with **no interference** - due to CVT principle
- **PosControl**; precise, easy and safe hydrostatic low speed positioning - with speed pedal input (brake pedal is not used)
- **DirectShift**; shift **drive direction** at any speed + use the speed throttle as brake pedal or combined with the brake pedal.
- **SmartStick**; select any lift function (on the joystick) and the intelligent controls will select the optimum engine speed
- **SpeedPedal**; select any drive speed (electronic throttle) and the intelligent controls will select the optimum engine speed
- **AutoBrake**; when speed throttle is not used and drive switch is in forward or reverse, the trucks stops (also in a slope).





Kalmar K-Motion – measurements...

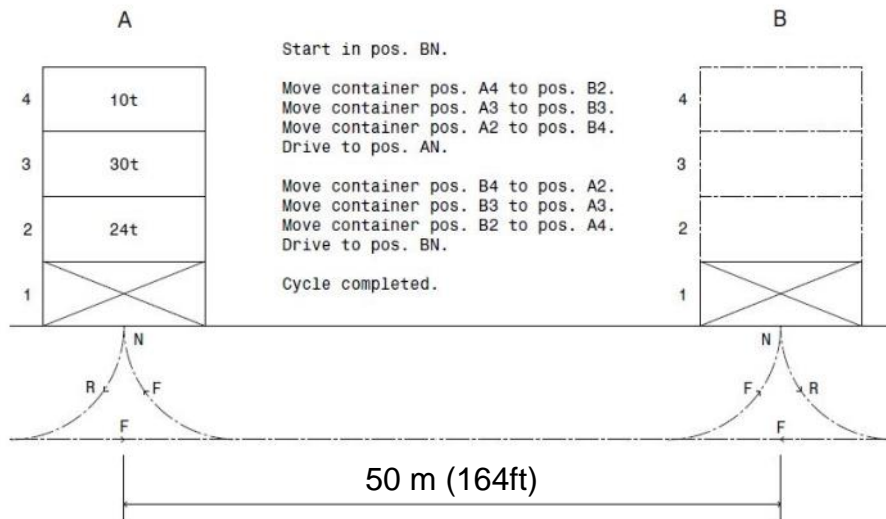
Test Cycles - Kalmar Internal (KI) + SmartFleet (SF)

Average working and test cycles

A) KI = Kalmar internal test cycle:

100% Handling (intensive)

0% Idle



B) SF = Customer own test cycle *:

70% Handling (medium-intensive)

30% Idle

* Various intensities / percentages

* Above is an example (only)



Emission Norms, Values & Dates.

Cleaner, leaner and stronger....

DRG Drive Lines (wheelbase 6,0 – 6,5 m)

Torque Converter or K-Motion (CVT)

Diesel Engines available on DRG

Modern, clean and strong diesel engines from Volvo and Cummins, approved and certified according to **EU stage 3A or 4 / EPA Tier 3 or 4F**.

Engines brand / series :		Volvo / D-8 (TAD-800-VE)	Volvo / D-8 (TAD-800-VE)
Emission approval (EU/EPA)		Stage 3A / Tier 3	Stage 4 / Tier 4F
Type of engine		4-stroke / Fixed Turbo / Intercooler	4-stroke / Variable Geometry Turbo / Intercooler
After treatment type		No SCR + No AdBlue + No EGR	SCR + AdBlue + Light EGR
Cylinders / volume / speed	(dm ³ /rpm)	6-inline / 7,70 / 1700	6-inline / 7,70 / 1700
Engine models		TAD-852	TAD-872
Power ratings, ISO 3046	(kW)	210	210
Torque peaks, ISO 3046	(Nm)	1237	1237
Transmission brand / series		DRTS / R2-RS / K-Motion	DRTS / R2-RS / K-Motion
Type designation		CVT (Hydrostatic + Mechanical)	CVT (Hydrostatic + Mechanical)
Max power rating	(kW)	220	220
Clutch / Transmission, type		CVT Powersplit	CVT Powersplit
Gears, forward – reverse		3 – 2	3 – 2
Drive axle, brand / type		Kessler / WDB / D102	Kessler / WDB / D102
Steer axle, brand / type		Kalmar / single cylinder	Kalmar / single cylinder



Combining the best from hydrostatic drive and mechanical drive solutions - into one package

Kalmar smart controls and smart programming

The available real power is there, but down-sizing the actual engine can still be done

Great traction and precision at low speeds

Seamless gear shifting and directional shifting

Significant fuel savings and reduction of emissions



Additional saving as options

Electronic "Start/Stop function"

Automatic engine shutdown (programmable)

Drive speed limitations (programmable)

SmartFleet monitoring (in real-time)

ECO Drive Modes (future development)

Hybrid functionality (future development)

Kalmar K-Motion – product range

Lift capacities from 42-25-12 up to 60-60-45 (tons)

Product range – Container Handling

Toplift spreader with Twistlocks + Lift Eyes (4x)



Product range – Intermodal Handling



Kalmar K-Motion

Click the link below for video:

www.transportevents.com/presentations/melbourne2016/k-motion_150603_H264_62800.wmv

Product range – Industrial Handling

Tool Carrier (multi)



Lift Hook (slings)





KALMAR